

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

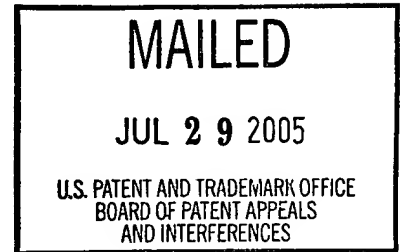
UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte KARL-HEINZ BUETTGEN,
MANFRED LINDEMANN, and DANIELA PRINZ

Appeal No. 2005-1232
Application No. 09/717,894

ON BRIEF



Before ELLIS, ADAMS, and MILLS Administrative Patent Judges.

MILLS, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. §134 from the examiner's final rejection of claims 1-10, which are all of the claims pending in this application.

Claim 1 is illustrative of the claims on appeal and reads as follows:

1. A process for the production of deacidified fats and/or oils comprising the steps of:

(a) reacting a triglyceride having an acid value of up to about 60 and an excess of a lower alcohol having from 1 to 4 carbon atoms and an effective amount of a lipase to form a pre-esterification product having an acid value from about 0.5 to about 10,

(b) optionally removing water and unreacted alcohol from the pre-esterification product,

Appeal No. 2005-1232
Application No. 09/717,894

(c) further reacting the pre-esterification product from step (a) or (b) with additional lower alcohol to form a post-esterification reaction product having an acid value of from about 0.1 to about 0.5.

The prior art references cited by the examiner are:

Lepper et al (Lepper)	4,608,202	Aug. 26, 1986
Gatfield	5,753,473	May 19, 1998

Grounds of Rejection

Claims 1-10 stand rejected under 35 U.S.C. § 103(a), as obvious over Gatfield in view of Lepper. We reverse this rejection.

DISCUSSION

35 U.S.C. § 103(a)

Claims 1-10 stand rejected under 35 U.S.C. § 103(a), as obvious over Gatfield in view of Lepper.

In rejecting claims under 35 U.S.C. § 103, the examiner bears the initial burden of presenting a prima facie case of obviousness. See In re Rijckaert, 9 F.3d 1531, 1532, 28 USPQ2d 1955, 1956 (Fed. Cir. 1993). It is well-established that the conclusion that the claimed subject matter is prima facie obvious must be supported by evidence, as shown by some objective teachings in the prior art or by knowledge generally available to one of ordinary skill in the art that would have led that individual to combine the relevant teachings of the references to arrive at the claimed invention.

Appeal No. 2005-1232
Application No. 09/717,894

See In re Fine, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988).

According to the examiner (Answer, pages 2 and 3):

Gatfield [] disclose[s] a method of treating Stillingia oil, a triglyceride, with a lower alcohol, ethanol, to produce a product comprising ethyl esters of trans-2-cis-4-decadienoic acid and other ethyl esters, such as esters of linolenic acid... using *C. antarctica* lipase as the catalyst. The reaction temperature is disclosed to be between 20 and 60°C... At least in Example 4, the concentration of lipase is 5% by weight of the triglyceride.

The reference differs from the claimed invention in that neither the starting acid number of the oil nor the final acid number of Stillingia oil is indicated. However, it is recognized in the art that vegetable oils, such as Stillingia oil, a vegetable oil obtainable from the fruit of the tallow tree, are not fully esterified and have acid numbers between 10 and 40 depending on the quality. Should Stillingia oil be considered a "commercial grade tallow", it would have an acid value of 30-40 (See, e.g. Lepper col. 1, lines 19-35). Thus, one of ordinary skill in the art would reasonably have expected that at least some free fatty acids are present in Stillingia oil. Accordingly, one of ordinary skill in the art would reasonably have concluded that the reactions disclosed in the examples in Gatfield [] are esterification reactions at least to some extent and that pre-esterification products having a lower acid number result from the reaction. See, e.g., Example 2, wherein *C. antarctica* lipase is used. It is noted that the proportion of transesterified product, if any, is very low.

The examiner relies on Lepper for the disclosure of a process in which the pre-esterification product is subjected to further esterification with the alcohol in transesterification reactions (See, e.g. Example 1). Id. The examiner also notes the background section of Gatfield discloses that lipase B is suitable for esterification in the reaction of coconut fat with ethanol in the presence of lipase B. Ethylcaprylate and ethyl caprate are produced in good yields by this process. According to the examiner,

Appeal No. 2005-1232
Application No. 09/717,894

this esterification process is the same as step (a) in the presently claimed process.

Answer, page 3.

The examiner concludes that (Answer, page 4)

one of ordinary skill in the art would have reasonably expected at the time the claimed invention was made that the reaction of a fat or oil with a lipase and a lower alcohol having an acid number of up to 60, such as coconut oil or Stillingia oil would result in a pre-esterification product, i.e., an ester or mixtures thereof, suitable for transesterification, using a lipase with similar results, as those disclosed by Lepper et al, since the reactions are substantially similar and differ only in the catalyst used. It is emphasized that the Lepper et al. reference uses coconut oil, albeit with a chemical catalyst, and that Gatfield et al. disclose the suitability of coconut oil to produce pre-esterified products (See, e.g. col. 1, lines 55-60) and teaches the use of lipase from *C. antarctica* for similar reactions (See, e.g., col. 2, line 10 and Example 2).

In response, appellants argue that “neither Gatfield nor Lepper, alone or in combination, teach or suggest all of the claim limitations of the present invention and, as a result, fail to render the claimed invention prima facie obvious.” Brief, page 3. In particular, appellants argue Gatfield and Lepper describe a transesterification process, not an esterification process. Appellants argue that “an esterification process is one by which an ester is formed by reaction an alcohol with an acid. Transesterification, on the other hand, is the reaction between an ester and another compound with exchange of alkoxy or acyl groups to form a different ester.” *Id.*

In addition, appellants argue the “Examiner has failed to satisfy her burden of proof in showing that Gatfield and/or Lepper teaches, suggests or motivates the use of a further reaction step to be performed on the pre-esterification product whereby the

final product has an acid value of from about 0.1 to about 0.5." Brief, page 4.

We agree with appellants that the examiner has not provided sufficient evidence to support a prima facie case of obviousness. The claims before us are clearly directed to a process for the production of deacidified fat and/or oils wherein the process primarily include two esterification reactions, a pre-esterification reaction, step (a), and a post-esterification reaction, step (c).

We agree with appellants that esterification reactions and transesterification reactions are understood in the art to have the specific meanings indicated herein. The examiner argues Gatfield discloses that lipase B is suitable for esterification in the reaction of coconut fat with ethanol in the presence of lipase B and that ethylcaprylate and ethyl caprate are produced in good yields by this process. According to the examiner, this esterification process is the same as step (a) in the presently claimed process. Answer, page 3. The examiner also argues that the use of lipases for the esterification of fatty acids with alcohols is well known. While we acknowledge that Gatfield may describe step (a) of the claimed process, we do not find the examiner has provided sufficient evidence that the combination of steps (a) and (b) were known in the art to produce deacidified fats and/or oils, as claimed. In our view, the examiner has not established that the evidence of record either suggests or describes use of a further reaction step to be performed on the pre-esterification product whereby the final product has an acid value of from about 0.1 to about 0.5 (step c).

For example, in the claimed process and in accordance with the specification, pages 5 and 6:

acidic fats and oils are mixed with the lipase and the lower alcohols... Once the product has reached an acid value of from about 0.5 to about 10 ... the water of the reaction formed is removed in a preferred embodiment of the invention in order to enable the equilibrium to be shifted further to the product side in the post-esterification. At the same time, the unreacted alcohol is at least partially removed....The post esterification is carried out under the same conditions as the pre-esterification and is terminated when the required acid number has been reached.

In contrast, in the esterification stage in the process of Lepper, the acid number of the oil or fat is reduced to values of the order of 1 or lower under fairly mild conditions (col. 3, lines 25-29). This step is followed by a transesterification step in Lepper (col. 2, lines 59-63 and col. 3, lines 46-50), not an esterification step performed in the presence of a lipase and alcohol, as claimed.

Another difference between the process of Gatfield and the claimed process as noted by the examiner, is that in Gatfield the lipase is recycled to treat the original substrate, rather than a pre-esterification product in the claimed process. Answer, page 4. According to the specification and claim 1, the addition of a second quantity of alcohol to the product of step (a), i.e., under the pre-esterification conditions, forms a post-esterification reaction product having an acid value of from about 0.1 to about 0.5. Specification, pages 5-6. In addition, the optional step (b) including the removal of the water of reaction formed in step (a) "in order to enable the equilibrium to be shifted further to the product side in the post-esterification." Specification, page 5.

The examiner argues that the “crux of appellants' argument is that the process of Gatfield is a transesterification rather than an esterification reaction. However, appellants fail to consider that Stillingia oil is comprised of free fatty acids at least to some extent, which would naturally be esterified in the process, by the reaction of the free fatty acids with the alcohol (Brief, page 3, paragraph 2).” Answer, page 5.

While this statement of the examiner may be true, the examiner has not indicated, and we do not find, where Gatfield particularly suggests focusing on any of the potential free fatty acids of Stillingia oil and esterifying them in the presence of a lipase and alcohol to obtain an improved yield of an esterified product therefrom having the claimed acid values or performing a second esterification step in the presence of lipase and alcohol.

Finally, the examiner argues that the process described in the Brief, at page 5, paragraph 2 “is the same esterification/transesterification process as claimed, albeit using chemical catalysts.” Answer, page 6. Appellants respond arguing, “[t]he claimed invention **IS NOT** directed to a transesterification process.” [Emphasis original.] Reply Brief, page 3. Thus, appellants argue that both step (a) and step (c) of the process of claim 1 are both esterification steps, and that neither step is a transesterification process. This statement in the prosecution history essentially prevents appellants from arguing that either of the claimed steps includes or is a transesterification step.

Appeal No. 2005-1232
Application No. 09/717,894


In view of the above, the rejection of claims 1-10 under 35 U.S.C. § 103(a), as obvious over Gatfield in view of Lepper is reversed.

CONCLUSION

The rejection of claims 1-10 under 35 U.S.C. § 103(a), as obvious over Gatfield in view of Lepper is reversed.

REVERSED


JOAN ELLIS
Administrative Patent Judge


DONALD E. ADAMS
Administrative Patent Judge


DEMETRA J. MILLS
Administrative Patent Judge

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Appeal No. 2005-1232
Application No. 09/717,894

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